

$$\begin{aligned}
 P(\mu - k\sigma < Z < \mu + k\sigma) &= P\left(-k < \frac{Z - \mu}{\sigma} < +k\right) \\
 &= \Phi(k) - \Phi(-k) = \Phi(k) - (1 - \Phi(k)) \\
 &= 2\Phi(k) - 1
 \end{aligned}$$

$$2\Phi(1) - 1 \approx 0.6826$$

$$2\Phi(2) - 1 \approx 0.9544$$

$$2\Phi(3) - 1 \approx 0.9972$$

$$Y = X_1 + X_2 + \dots + X_n$$

$$\begin{aligned}
 E[Y] &= E[X_1 + X_2 + \dots + X_n] = E[X_1] + E[X_2] + \dots + E[X_n] \\
 &= n\mu
 \end{aligned}$$

$$\begin{aligned}
 \text{Var}(Y) &= \text{Var}(X_1 + X_2 + \dots + X_n) = \text{Var}(X_1) + \text{Var}(X_2) + \dots + \text{Var}(X_n) \\
 &= n\sigma^2
 \end{aligned}$$